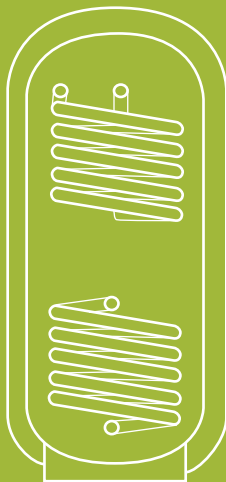
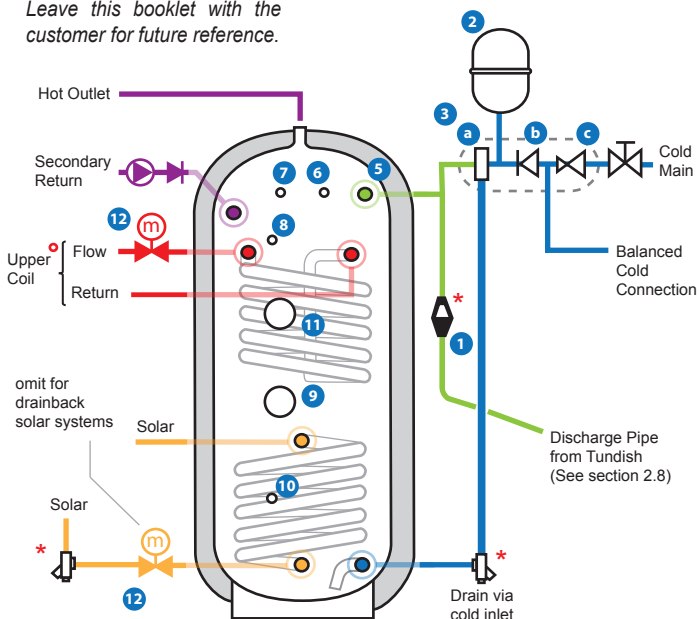


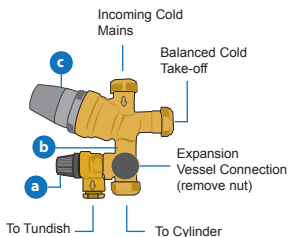
Installation Maintenance



Leave this booklet with the customer for future reference.



3 Inlet Control Set



* These components must be positioned away from electrical devices

o Upper coil Twin Coil Models only (V... and V...P type)

See page 13 for Pre-plumbed cylinder connections.

Installation Kit

No.	Description	Twin Coil $\nabla \cdot \cdot \cdot \nabla$ $\nabla \cdot \cdot \cdot \nabla$	Solar Electric $\nabla \cdot \cdot \cdot \nabla$
1	Tundish	✓	✓
2	Expansion Vessel	✓	✓
3	Inlet Control Set:	✓	✓
	a Expansion relief valve	✓	✓
	b Check valve	✓	✓
	c Pressure reducing valve with strainer	✓	✓
5	Temperature and pressure relief valve	✓	✓
6	Temperature Sensor Pocket	✓	✓
7	High Limit Thermostat (for solar)	✓	✓
8	Dual Thermostat (for boiler)	✓	
9	Electrical Immersion Heater	✓	✓
10	Sensor Pocket (solar controller)	✓	✓
11	Upper Electrical Immersion Heater		✓
12	2 Port Motorised Valve	x 2	x 1
13	Wiring Centre	✓	✓

1.0 Introduction

The Symphony range of unvented twin coil and solar electric cylinders has been designed by experts in solar technology at Viridian Solar to ensure that the solar energy and auxilliary heat source work together in harmony. A generous solar-dedicated volume results in optimised solar energy gains. It is made from corrosion resistant Duplex Stainless Steel, highly insulated with environmentally friendly foam and enclosed in a smart steel casing.

To help ensure compliance with the relevant Water and Building Regulations all units are supplied complete with safety and control devices to connect to the cold water main. Pre-adjusted, high quality controls ensure high flowrate performance.

Symphony is approved to demonstrate compliance with Water Regulations and Building Regulations G3 & Part L.

1.1 Storage Before Installation

The cylinder should be stored upright in a dry area and kept in its original packaging.

1.2 Installation

This cylinder should only be installed by a competent person holding a G3 unvented qualification. The installation of this product is notifiable under the national building regulations. Leave this booklet with the customer for future reference.

1.3 Water Supply

Symphony Cylinders are capable of delivering over 50 litres per minute, however the flow rate will be influenced by the water supply. A minimum of 1.5 bar at 20 l/m flow should be available from the main, which should be tested to ensure it can meet these requirements. It is important that site pressure readings are taken under dynamic flow conditions; high pressure at zero flow is not necessarily indicative of satisfactory performance. If necessary consult the local water supplier.

A minimum of 22mm supply pipe-work is recommended and existing 15mm cold mains pipe-work may need to be upgraded. Where mains inlet pressures are likely to exceed 16 bar then an additional pressure reducing device should be fitted upstream.

In areas where Calcium Carbonate content is greater than 200ppm the cylinder temperature should be set no higher than 60°C and hard water treatment should be considered

1.4 Location

It is recommended that the cylinder is located within the heated part of the building. If this is not possible then frost protection is required and additional insulation to pipes and cylinder should be provided.

Install the cylinder on a flat base capable of supporting its weight when full. The minimum recommended cupboard size is at least 650mm square. Position to provide access to the valves for maintenance, remembering that immersion heaters require a space of 375mm for removal.

2. Installation

Each potable and primary water connection on the cylinder is 22mm compression with gland nut and olive supplied. These connections are designed to accept Table X Copper Tube only.

2.1 Cold Main

Run the cold main to the cylinder and fit an isolating valve (4). A 22mm quarter turn full bore valve is recommended. Do not use "screwdriver slot" or similar valves. Make the connection to the cold feed of the cylinder and fit a drain valve. Install the cold inlet set (3) just above the Temperature & Pressure Relief Valve - TPRV (5) so the cylinder does not have to be drained for servicing. Ensure that the arrow points in the direction of the water flow.

Select a suitable position for the expansion vessel (2). Mount it to the wall using the bracket provided. Use the hose to connect to the cold inlet set.



Do not install any isolation valve between cylinder and safety valves

2.2 Balanced Cold Connection

There is a 22mm balanced connection on the cold inlet set for outlets that require a balanced supply. Do not use monobloc mixer tap or showers without a balanced cold connection as this will back pressurise the cylinder and result in discharge.

2.3 Hot Water Pipework

Run the first part of the hot water distribution pipework in 22mm, reducing as appropriate to the outlet. Aim to reduce the volume of the hot draw off pipework to a practical minimum to give a fast hot water response.

2.4 Upper Coil (Twin Coil only)

Compression connections are provided for the primary circuit, which must be positively pumped. Primary flow and return connections are interchangeable.

Both sealed or vented primary circuits can be used up to a maximum pressure of 7 bar. The primary heat source must be under thermostatic control. Uncontrolled heat sources for example back boilers and solid fuel stoves are not suitable. A two port zone valve (supplied) should be fitted into the primary flow pipework and wired via the dual control and high limit thermostat (6).

All hot pipes must be insulated to at least 1m from the cylinder or until they become concealed.

2.5 Solar Coil

The lower coil is connected to the solar heat source. The solar controller must be wired through the high limit thermostat (7) to cut off solar energy input in the event of cylinder over-temperature. Pressurised (fully-filled) solar systems (V250, V260, V270) should also be fitted with a normally closed two port motorised valve (supplied), energised from the high limit thermostat. A two port valve must not be fitted when using a drain-back solar system (V200).

Insert the solar cylinder sensor into the lower sensor pocket (10).

2.6 Secondary Circulation

Where secondary circulation is required a pump suitable for potable water should be used in conjunction with a non return valve to prevent backflow. It may be necessary to incorporate an extra expansion vessel into the circuit to accommodate the increased system water volume in larger secondary circulation systems. A secondary return boss is fitted as standard on all models.

2.7 Immersion Heater(s)

Each 3kW immersion heater is fitted with a thermal cut-out in addition to the normal control thermostat. To help ensure correct replacement the immersion heaters have a special 1 3/4" thread. Do not replace this component with an immersion heater without a thermal cut-out.

The 'O'ring on the head of the immersion heater should be correctly positioned and lubricated before fitting. Screw in hand-tight then gently tighten.

The electrical supply must be fused at 13A via a double pole isolating switch to BS 3456. The cable must be 2.5 sq.mm heat resistant (85°C HOFR) sheathed flex complying to BS 6141:1981 Table 8. The electricity supply should comply with local regulations, and be fitted by a qualified Part P electrician.



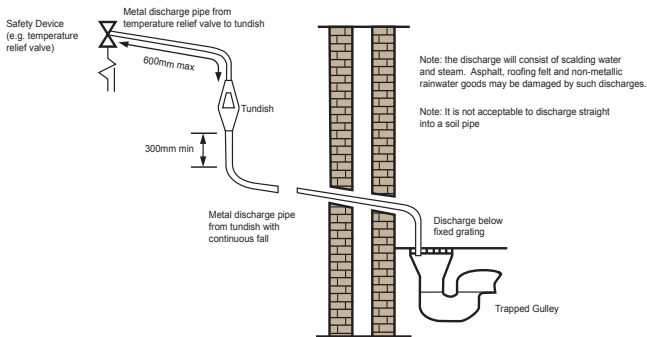
Do not operate the immersion heater until the unit is full of water.

2.8 Discharge Arrangement

The discharge pipework must be routed in accordance with Part G3 of schedule 1 of the Building Regulations. (www.planningportal.gov.uk). Cylinder relief valve connections must not be used for any other purpose.

The discharge from both the temperature and pressure relief and expansion relief valves can be joined together via a 15mm end feed Tee. The Tundish must be mounted vertically in a position that is away from electrical devices and visible to occupants. It must be located in the same space as the unvented hot water storage system and be fitted as close as possible with a pipe length of no more than 600mm between tundish and valve outlet.

Diagram of a typical discharge pipe arrangement (extract from Building Regulation G3)



The discharge pipe from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal and:

a) Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long i.e. discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27m at least 3 sizes larger, and so on. Bends must be taken into account in calculating the flow resistance.

An alternative approach for sizing discharge pipes would be to follow BS6700 Specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages. b) Have a vertical section of pipe at least 300mm long, below the tundish before any elbows or bends in the pipework.

c) Be installed with a continuous fall.

d) It is preferable for the discharge to be visible at both the tundish and the final point of discharge but where this is not possible or practically difficult there should be clear visibility at one or other of these locations.

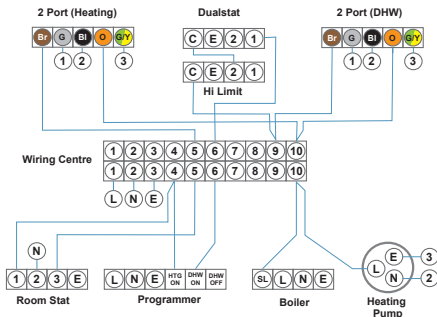
Examples of acceptable discharge arrangements are:

- i. Ideally below the fixed grating and above the water seal in a trapped gully.
- ii. Downward discharges at a low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children play or otherwise come into contact with discharges, a wire cage or similar guard is positioned to prevent contact whilst maintaining visibility.
- iii. Discharges at a high level; e.g. in to metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering systems that would collect such discharges (tundish available).
- iv. Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe to be connected. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

2.9 Wiring Diagrams

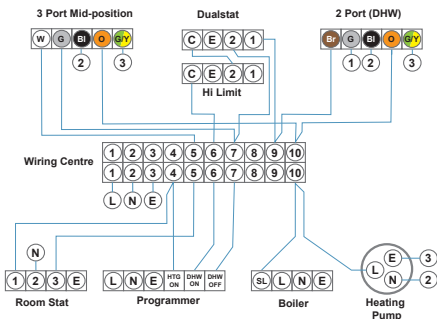
2 x 2 Port Zone Valves (S Plan)

Boiler Control



3 Port + 2 Port Valves (Y Plan)

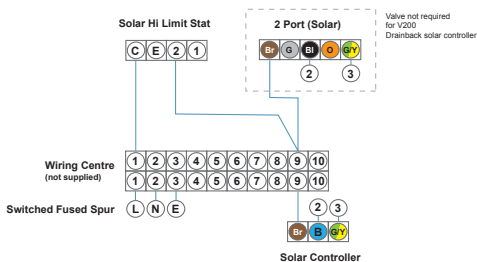
Boiler Control



L	Live	N	Neutral	E	Earth
Br	Brown	B	Blue	G/Y	Green/Yellow
W	White	O	Orange	G	Grey
Bl	Black	C	Common	SL	Switched Live

See page 14 for pre-plumbed cylinder wiring.

Solar Wiring



3.0 Commissioning and Servicing

3.1 Filling

Check all connections for water-tightness including any factory made connections. Prior to filling the cylinder, the pressure in the expansion vessel should be checked to ensure it is 3 bar. The hot tap furthest away from the cylinder should be opened before filling the system to let air out.

The system should be flushed before use. The remaining taps should be opened in turn to expel air.

3.2 Heating Circuits

Ensure the lever on the two port valve is set to the filling position and use the boiler manufacturers commissioning instructions to fill the primary circuit. When full release the lever. Switch the programmer to Domestic Hot water (DHW) and allow the unit to start to heat.

Follow the solar commissioning instructions for the solar circuit.

3.3 Storage Temperature

Adjust the dial of the dual thermostat (twin coil) or immersion heater setting to between 55°C and 65°C as required. A storage temperature of 60-65°C is normal. In many healthcare applications the guidance on Legionella control and safe water delivery temperatures will require storing the water at 60-65°C, distributing at 50-55°C and using thermostatic mixing valves to control the final temperature.

3.4 Safety Valve Checks

Any water coming from either the expansion relief valve or the temperature / pressure relief valve during heat up is indicative of a problem.

The temperature relief and expansion relief valves should be fully opened, one at a time then both together allowing as much water as possible to flow through the tundish. Check that the discharge pipework is carrying the water away without spillage over the tundish. Release the valves and check that they reseal properly.



Never bypass safety devices or operate the unit without them fully operational.

3.5 Draining

Isolate from the electrical supply to prevent damage to the immersion heaters. Isolate the unit from the cold mains. Open the hot tap closest to the unit and syphon from the draining tap with a hose.



Water may be very hot.

3.6 Annual Servicing

A competent installer should carry out the following checks on an annual basis:

1) The expansion relief valve on the cold inlet set should be eased open allowing water to flow for 5 seconds. The valve should then be closed making sure it reseats correctly. Repeat this procedure with the pressure and temperature relief valve. Ensure that the discharge pipework is allowing the water to drain away.



Water may be very hot.

2) Ensure that any immersion heater is working correctly and that is controlling the water at a temperature of between 55°C and 65°C.

3) Make sure the gas side in the expansion vessel is charged to 3 bar. Turn off the water supply to the unit and open a hot tap first. Air or CO₂ can be used to repressurise the expansion vessel.

4) Remove the head on the cold inlet set by unscrewing, and clean the mesh filter within.

5) The service record supplied within this manual should be updated at each service.



The Guarantee may be void without proof of annual servicing and a completed installation checklist.

4.0 Warranty

The Symphony cylinder carries a 25 year guarantee for the stainless steel vessel against faulty materials or manufacture provided that:

- It has been installed by a competent person according to the prevailing standards, regulations and this installation guide.
- It has not been modified, misused, tampered with or subjected to neglect.
- It has only been used for the storage of potable water.
- It has not been subjected to frost damage.
- The completed service record confirms an annual service by a competent person.
- The system is fed from a public water supply.

The guarantee period starts from the date of purchase and no registration is required. The guarantee is not transferable, and rests with the original householder.

Please note that invoices for servicing may be required to confirm the service record. All the components supplied with the cylinder carry a 2 year guarantee.

Exclusions - The Guarantee does not Cover:

The effects of scale build up. Any labour charges associated with replacing the unit or its parts. Any consequential losses caused by the failure or malfunction of the unit.

In the Event of a Problem

If you have a problem in the first year contact the plumber who fitted the unit. Thereafter contact the plumber who carries out the annual servicing.

5.0 User Instructions

Your hot water cylinder is automatic in normal use and requires only annual servicing. You should employ an competent person to perform annual servicing.

The immersion heater is provided as a means of back up heating, and should not be used at the same time as the primary heat source.

For advice on how to get the most from your solar heating equipment, refer to the Clearline User Manual.



If water is flowing through the safety valves and into the tundish this indicates a fault condition. If this water is hot turn off the boiler, solar system and immersion heater. Do not turn off the water until the cylinder cools. Call a plumber.

Commissioning Checklist



The Commissioning Checklist is to be completed in full by the competent person who commissioned the Symphony cylinder as a means of demonstrating compliance with the appropriate Building Regulations. This booklet should be handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty, but does not affect statutory rights.

Customer Name _____ Telephone _____

Address _____ Cylinder Model _____

Cylinder Type *Viridian Solar Symphony* V515 ☐ V518 ☐ V521 ☐ V525 ☐ V530 ☐

Cylinder Serial Number _____ V515E ☐ V518E ☐ V521E ☐ V525E ☐ V530E ☐

Commissioned by (print name) _____ V515P ☐ V518P ☐ V521P ☐ V525P ☐ V530P ☐

Company Name _____ Telephone _____

Company Address _____

Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*

Building Regulations Notification Number _____

Settings

Primary circuit sealed or open vented system? _____ Sealed ☐ Open ☐

Maximum primary flow temperature? _____ °C

Incoming static cold water pressure at the inlet to the system? _____ bar

Strainer been cleared of installation debris (if fitted)? _____ Yes ☐ No ☐

Is the installation in a hard water area (CaCO₃ above 200ppm)? _____ Yes ☐ No ☐

If yes, has a water scale reducer been fitted? _____ Yes ☐ No ☐

Type of scale reducer fitted? _____

Hot water thermostat set temperature? _____ °C

Maximum hot water flow rate at set thermostat temperature (measured at high flow outlet)? _____ l/min

Time and temperature controls been fitted in compliance with Part L of Building Regulations? _____ Yes ☐

Type of control system _____ Y Plan ☐ S Plan ☐ Other ☐

Hot water temperature at the nearest outlet? _____ °C

All appropriate pipes insulated up to 1m or the point where they become concealed? _____ Yes ☐

Where is the pressure reducing valve situated? _____

Pressure reducing valve setting? _____ bar

Combined temperature and pressure relief valve and expansion valve fitted and discharge tested? _____ Yes ☐ No ☐

Tundish and discharge pipework been connected and terminated to Part G of Building Regulations? _____ Yes ☐

All energy sources fitted with a cut out device? _____ Yes ☐ No ☐

Expansion vessel pressure checked? _____ Yes ☐ No ☐

Declaration

The hot water system complies with the appropriate Building Regulations _____ Yes ☐

The system has been installed and commissioned in accordance with the manufacturer's instructions _____ Yes ☐

The system controls have been demonstrated and understood by the customer _____ Yes ☐

The manufacturer's literature, including Checklist and Service Record has been explained and left with the customer _____ Yes ☐

Competent Person's Signature _____

Customer's Signature _____

(Confirming satisfactory demonstration and receipt of manufacturer's literature)

* All installations in England and Wales must be notified to a Local Authority Building Control either directly or through a Competent Persons Scheme.
A Building Regulations Compliance Certificate will then be issued to the customer.

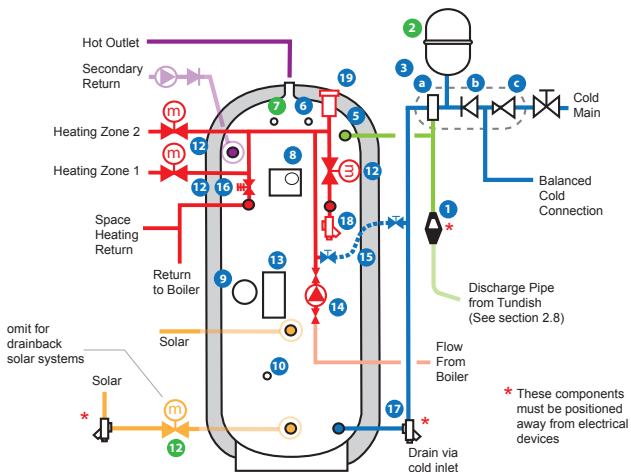


Service Record

1 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____	2 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____
3 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____	4 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____
5 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____	6 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____
7 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____	8 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____
9 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____	10 Technician _____ Company _____ Telephone _____ Notes _____ _____ Signature _____ Date _____

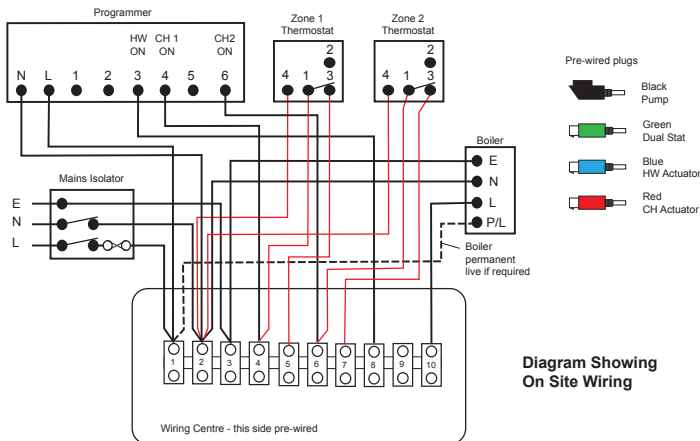
Your Symphony solar cylinder should be serviced annually by a competent person following the procedure in Section 3.7 and completing the record above.

Pre-plumbed Cylinder



No.	Pre-plumbed Components
1	Tundish
3	Inlet Control Set:
a	Expansion relief valve
b	Check valve
c	Pressure reducing valve with strainer
5	Temperature and pressure relief valve
6	Temperature Sensor Pocket
8	Dual Thermostat (for boiler)
9	Electrical Immersion Heater
10	Sensor Pocket (solar controller)
11	Upper Electrical Immersion Heater
12	2 Port Motorised Valve
13	Wiring Centre
14	Primary Circulating Pump

15	Primary Filling Loop (disconnect)
16	Auto By-pass Valve
17	Drain Cock (cold feed)
18	Drain Cock (primary loop)
19	Auto Air Vent
No.	Loose Components
2	Expansion Vessel (potable water)
7	High Limit Thermostat (solar)
12	2 Port Motorised Valve
	Expansion Vessel (primary loop)
	3 bar Pressure Relief Valve
	Pressure Gauge
	Primary Manifold
	3 Channel Programmer
	Room Thermostat



Connections

Potable water connections should be made as described in Section 2. Primary pipework connections are 22mm compression fittings with gland nut and olive, and should be made according to the drawing above. The circulating pump comes with a transit pipe, which should be removed before a connection is made. Wire according to the diagram above.

Filling and Commissioning the Primary Circuit

Fill and flush in the usual manner. Ensure all drain points and air valve are closed and that the 2 port valve and pump isolation valves are open. Fill via the filling loop.

Release all air from the auto-air valve and any other high points in the system. Fill to a pressure according to the requirements of both boiler and radiator manufacturers. During filling, check that all plumbing connections (including factory-made) are fully water tight. Whilst every care is taken to ensure factory-made connections are water tight, the effects of transit may cause some connections to subsequently leak, for which Viridian Solar can accept no responsibility for damage or inconvenience caused.

Once full of water and devoid of air, turn on the boiler and thermostats to heat both water and heating circuits. The recommended hot water storage temperature is 60C. Adjust the auto by-pass valve according to the manufacturers instructions (included).

Specification

Model		V515	V518	V521	V525	V530
Size	litres	150	180	210	250	300
Dedicated Solar Volume (Vs)	litres	75	90	105	110	125
Primary Heated Volume (Vb)	litres	75	90	105	140	175
Heat Loss (whole cylinder)	kWh/24h	1.41	1.53	1.80	2.15	2.28
Heat upTime (upper coil)	minutes	12.0	15.5	19.0	23.0	29.0
Reheat Time (upper coil)	minutes	9.4	12.1	14.8	18.5	24.1
Heat upTime (electric cylinder)	minutes	85	93	119	160	199
Weight (empty)	kg	40	45	48	53	63
Weight (full)	kg	190	225	258	303	363
Height	mm	1,102	1,290	1,478	1,782	2,041
Diameter	mm	545	545	545	545	545
Solar Coil Volume	litres	2.0	2.6	3.6	3.8	3.8
Solar Coil Surface Area	m ²	0.41	0.54	0.76	0.79	0.79
Primary Coil Rating	kW	16.7	15.8	14.9	14.6	17.9
Maximum Water Supply Pressure	bar	16				
Maximum Coil Pressure	bar	3				
Operating pressure	bar	3				
Expansion Valve Setting	bar	6				
T&P Valve Setting	°C/bar	90/7				
Expansion Vessel Charge	bar	3				
Immersion Heater Rating	kW	3				
Immersion Heater Length	mm	350 (twin coil) 400 (electric)				
Global Warming Potential	CO ₂ equiv	1				
Ozone Depletion Potential		Zero				

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